

CLAIMS

1. A transmitter comprising:

quadrature modulation means for inputting an in-phase
5 component and a quadrature component of an input modulation
signal and performing quadrature modulation;

variable gain amplification means for amplifying output
of the quadrature modulation means with a gain being controlled
based on a gain control signal; and

10 power amplification means for performing power
amplification of output of the variable gain amplification
means,

wherein the power amplification means has a linear mode
for performing power amplification using a linear operation
15 region in an input/output power characteristic and a saturation
mode for performing power amplification using a saturation
operation region in the input/output power characteristic, and

wherein, if transmission output power is equal to or
greater than a predetermined value, the output level of the
20 variable gain amplification means is adjusted, the power
amplification means is operated in the saturation mode, and
a transmission output control signal amplitude-modulated
based on an amplitude component of the input modulation signal
is input to an output control input terminal of the power
25 amplification means for performing polar coordinate

modulation; if the transmission output power is less than the predetermined value, the output level of the variable gain amplification means is adjusted, the power amplification means is operated in the linear mode, and a transmission output
5 control signal of a predetermined level responsive to the transmission output power is input to the output control input terminal for performing linear amplification.

2. The transmitter according to claim 1,
10 wherein, if the transmission output power is at the maximum output level or in the proximity thereof, the power amplification means performs the polar coordinate modulation and if the transmission output power is smaller than the maximum output level or the proximity thereof, the power amplification
15 means performs the linear amplification.

3. The transmitter according to claim 1 or 2,
wherein the power amplification means comprises a power supply terminal used as the output control input terminal, and
20 wherein the transmitter further comprises a power supply driver for increasing the current capacity of the signal of the predetermined level or the signal amplitude-modulated based on the amplitude component of the input modulation signal and supplying power to the power supply terminal as the
25 transmission output control signal.

4. The transmitter according to claim 1 or 2,
wherein the power amplification means comprises:
a power supply terminal to which fixed power supply
is input; and
an amplification circuit bias terminal used as the
output control input terminal to which the transmission
output control signal is input.
5. The transmitter according to any one of claims 1 to 4,
further comprising a transmission output control signal input
section for inputting the transmission output control signal,
wherein the transmission output control signal input section
comprises a DA converter for converting a digital signal into
an analog signal, and
wherein the DA converter can change an operation clock
and has an operation clock switch function for operating with
a higher operation clock than that when the linear
amplification is performed only when polar coordinate
modulation is performed in the power amplification means.
6. The transmitter according to claim 3 or 5,
wherein an input section of the power supply driver
comprises an operational amplifier for waveform shaping, and
wherein the operational amplifier can change an

operation current and has an operation current switch function for increasing the operation current as compared with that when the linear amplification is performed only when polar coordinate modulation is performed in the power amplification means.

7. The transmitter according to claim 3 or 5, wherein the power supply driver is a liner regulator.

10 8. The transmitter according to claim 3 or 5, wherein the power supply driver is a switching regulator.

9. The transmitter according to claim 3 or 5, wherein the power supply driver comprises:

15 amplitude slice means for slicing the transmission output control signal at stepwise different voltage levels;

a plurality of switching regulators for converting the power supply voltage into voltages of stepwise different values; and

20 a switch group for selecting any one of the output voltages of the plurality of switching regulators.

10. The transmitter according to any one of claims 1 to 9, further comprising:

a demodulation section for demodulating output of the power amplification means; and

a control section for adjusting the timing of amplitude modulation when polar coordinate modulation is performed in
5 the power amplification means based on information of a demodulation signal provided by the demodulation section.

11. A wireless communication apparatus comprising a transmitter as claimed in any one of claims 1 to 10.

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